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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,743	09/05/2003	Gil Cohen	20002/020022-US0	8922

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EXAMINER
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KANG, JULIANA K

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 05/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/657,743

Applicant(s)

COHEN, GIL

Examiner

Juliana K. Kang

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Priority*

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. **Claims 1-5, 8, 14, 26, 27-31, 35 and 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Betts et al (U.S. Patent 5,930,441).**

Regarding claims 1, 3, 4, 8, 14, 26, 27, 30, 35, and 36, Betts et al disclose a variable optical filter comprising an input fiber (3), an output fiber (6), a phase changing element (1, liquid crystal, electro-optic element [column 3 lines 22-23]) placed between the input and output fibers, a drive source operative to change the phase of light (see column 2 lines 38-40; column 3 lines 13-14, 36-38) by rotation of an optical axis of the phase changing element (see column 3 lines 33-36). Betts et al disclose that the phase changing element can be used as an optical attenuator or a mode-convert (see column 4 lines 17-22, 57-64).

Regarding claims 2, 28 and 29, Betts et al disclose the claimed limitations (see claim 18 of Betts et al).

Regarding claims 5 and 31 Betts et al disclose two liquid crystal films orthogonally aligned (see column 3 lines 26-27, 31-33).

**4. Claims 1, 3, 9-11, 13, 15-17, 27, 30, 34 and 40-43 are rejected under 35 U.S.C. 102(b) as being anticipated by Dupont et al (U.S. Patent 5,907, 645).**

Regarding claims 1, 3, 27, 30, 40, 42 and 43, Dupont et al disclose input optical fibers and output fibers (A2, B2, A3, B3), a phase changing element (1, liquid crystal), a drive source (see column 5 line 41) controlling the phase changing element by rotation of the optical axis (see column 1 lines 42-48).

Regarding claims 15 and 16, Dupont et al disclose a reflecting surface (25) that is formed on the rear side of the phase changing element (see Fig. 9).

Regarding claims 9-11, 13, 17, 34, and 41, Dupont et al disclose the phase changing element that has two separate electrodes (4, 5) which is separately controllable (see Fig. 4). Dupont et al also teach striped electrodes (see Fig. 8). Thus, Dupont et al inherently teach the claimed limitations.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**6. Claims 6 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Betts et al (U.S. Patent 5,930,441) as applied to claims 1, 3, 27, and 30 and further in view of Liu et al (U.S. Patent 6,141,076).**

Regarding claims 6 and 32, as described above, Betts et al disclose the claimed invention including a serial pair of liquid crystals (liquid crystal element) that are orthogonal to each other. However, Betts et al do not teach that the liquid crystals are twisted structure. Liu et al teach an elector-optic modulator using a twisted liquid crystal structure to provide fast response time, low required driving voltage, high contrast and/or the ability to achieve both analog and binary operations. Thus, it would have been obvious to one with ordinary skill in the art at the time the invention was made to use a twisted liquid crystal structure in Betts et al as taught by Liu et al to provide fast response time, low required driving voltage, high contrast and/or the ability to achieve both analog and binary operations.

**7. Claims 7, 12, 18 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dupont et al.**

As described above, Dupont et al disclose the claimed invention except the claimed arrangement of the pixels and location of the electrodes. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the electrode in any location including remote from the area of the pixel as long as the electrode effects the phase changing element and any arrangement of pixels including two orthogonally aligned pixels and four pixels arranged in opposite quarters, since, it

Art Unit: 2874

has been held that rearranging parts or duplication of the essential working parts of a device involves only routine skill in the art.

**8. Claims 19-25, 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dupont et al and further in view of Wang et al (U.S. Patent 6,175, 667 B1).**

Regarding claims 22-25, as described above Dupont et al disclose the claimed invention including a reflecting surface (see Fig. 9). However, Dupont et al do not teach a quarter wave plate. Wang et al teach polarization insensitive modulator having a quarter wave plate with a reflector in order to further increase the polarization insensitiveness (see column 6 lines 38-59). Dupont et al also teach a polarization insensitive modulator. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to place a quarter wave plate between the reflector and the phase changing element in Dupont et al as taught by Wang et al to increase the polarization insensitiveness. Since a quarter wave plate is a flat structure it can be operative as a substrate or as an alignment layer.

Regarding claims 19-21, 37 and 38, Dupont et al and Wang et al teach having additional quarter wave plate in combination of a reflection surface to rotate the polarization direction by 90 degrees. However, Dupont et al and Wang et al do not teach a half wave plate. One half wave plate is equivalent to having a quarter wave plate together with a retro-reflection surface, both rotating the polarization direction by 90 degrees. Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use different configurations such as a half wave

Art Unit: 2874

plate instead of a quarter wave plate together with a retro-reflection surface in Dupont et al and Wang et al as long as the polarization rotation is 90 degrees which decreases the polarization insensitiveness. Also having one half wave plate would make the device more compact. Since a half wave plate is a flat structure it can be operative as a substrate or as an alignment layer.

**9. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Betts et al.**

As described above, Betts et al disclose the claimed invention except a detector element and a drive circuitry for controlling the phase change. Betts et al teach the phase changing element is electrically tunable (see column 3 lines 12-13). Thus, one with ordinary skill in the art would have recognized a detector and a drive circuitry in Betts et al to effectively and precisely tune the phase changing element.

**Conclusion**

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sharp et al (U.S. Patent 6,141,069) and Anderson et al (U.S. Patent 6,130,731) teach liquid crystal phase modulator. Yan et al (U.S. Patent 6,560,396 B1) teach a variable optical attenuator having two segmented phase shifting means.


11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juliana K. Kang whose telephone number is (571) 272-

Art Unit: 2874

2348. The examiner can normally be reached on Mon. & Fri. 10:00-6:00 and Tue. & Thur. 10:00-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rod Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Juliana Kang  
May 7, 2004